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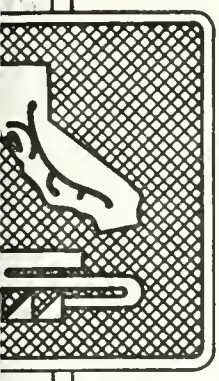

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State of California

THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 117-7

SAN LUIS RESERVOIR AND FOREBAY RECREATION DEVELOPMENT PLAN

Appendix C: FISH AND WILDLIFE DEVELOPMENT PLAN

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JUNE 1966

HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

State of California

THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 117-7

SAN LUIS RESERVOIR AND FOREBAY RECREATION DEVELOPMENT PLAN

Appendix C: FISH AND WILDLIFE DEVELOPMENT PLAN

JUNE 1966

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Director
Department of Water Resources

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FOREWORD

This is an appendix to Bulletin 117-7, "San Luis Reservoir and Forebay Recreation Development Plan" May 1965. Fish enhancement features and management of wildlife populations described in this appendix should be implemented to realize the full recreation potential of San Luis reservoir and San Luis Forebay.

The estimate of fishery potential of San Luis reservoir and San Luis Forebay described in this appendix was based on a general reservoir operation schedule which includes variations for wet, normal, and dry years. If this schedule is found to be not applicable, it will be necessary to modify the fishery potential estimate.

William E. Warne, Director
Department of Water Resources
The Resources Agency
State of California

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SAN LUIS RESERVOIR AND FOREBAY FISH AND WILDLIFE DEVELOPMENT PLAN

The Davis-Dolwig Act declares it is necessary for the general public health and welfare that preservation and enhancement of fish and wildlife be provided for in connection with the construction of state water projects. It directs the Department of Water Resources to acquire lands and to locate and construct water projects in such a manner as to permit their use for the preservation and enhancement of fish and wildlife and for recreation. It also declares that the Department of Water Resources, in fixing and establishing prices, rates, and charges for water and power, shall include as a reimbursable cost of any state water project an amount which is sufficient to repay all costs incurred by the Department for the preservation of fish and wildlife and which is determined to be allocable to the costs of the project works constructed for the development of such water and power. Costs incurred for the enhancement of fish and wildlife shall be nonreimbursable costs and shall not be included in the prices, rates, and charges for water and power.

In conformance with these provisions, studies have been made to determine the effect of construction of San Luis reservoir and San Luis Forebay on fish and wildlife and to determine the facilities and funds needed to preserve and enhance the fish and wildlife in this area. Addendum B contains the Department of Fish and Game's report presenting a fish and wildlife development plan for San Luis reservoir and San Luis Forebay. This plan would be developed in conjunction with the recreation plan described in Bulletin No. 117-7, "San Luis Reservoir and Forebay Recreation Development Plan", May 1965. No additional land acquisition would be required.

Nine hundred acres of land immediately south of State Highway 152 and west of San Luis reservoir, as shown on Plate 1 of Addendum B, would be developed and maintained for mitigation of wildlife losses. A portion of the shoreline area would also be made available for the same purpose.

Land scheduled for future recreation development can initially be used for wildlife and then be developed as needed for other purposes. The design of fish and wildlife facilities and plans for operation, maintenance, and management of these facilities should be submitted to the Department of Water Resources for approval, to assure that the fish and wildlife developments and operations will not be detrimental to other purposes of the water project.

Lands acquired by the State north of State Highway 152 as part of the project land acquisition program will be held in state ownership to assure control of possible future uses of these lands. Most of these project lands are at higher elevations and provide a natural background for the recreation activities. This natural background should be retained in its present condition.

The San Luis division of the California Aqueduct is a joint venture of the state and federal governments. The U. S. Bureau of Reclamation is the constructing agency and the California State Department of Water Resources will be the operating agency. The costs of construction are shared: 55 percent is paid by the State and 45 percent is paid by the United States, per Agreement No. 14-06-200-9755 between the two agencies executed December 30, 1961.

RECOMMENDATIONS

To protect existing wildlife resources and to develop the fishery enhancement potential of San Luis reservoir and San Luis Forebay, it is recommended that:

1. The nine hundred acres shown on Plate 1 of Addendum B between the Honker Bay and Dinosaur Point recreation areas on San Luis reservoir and State Highway 152 be retained in state ownership and be developed and maintained for wildlife to mitigate for wildlife losses attributed to the project.

2. Certain portions of the shoreline area shown on Plate 1 of Addendum B as project lands with wildlife values be made available to the Department of Fish and Game for compensatory wildlife habitat development. Such development would be under a plan mutually agreeable to the Departments of Parks and Recreation and Water Resources, and the U. S. Bureau of Reclamation.

3. A total of $25,000 be provided to the Department of Fish and Game from project funds to finance the capital costs of developing habitat on wildlife mitigation lands.

4. The Department of Fish and Game be provided with $3,500 annually from project funds for operation, maintenance, and replacement costs on wildlife lands.

5. An appropriation of $90,000 be made to the Department of Fish and Game over a two-year period from the General Fund for the capital costs of establishing game fish populations in San Luis reservoir and San Luis Forebay.

6. An appropriation of $55,000 be made from the General Fund to the Department of Fish and Game over a two-and-one-half-year period,

beginning in 1968, for a fishery development program to develop a long-range fishery management plan for San Luis reservoir and San Luis Forebay.

7. Controlled hunting be permitted on San Luis State Recreation Area in accordance with a wildlife management plan mutually acceptable to the Departments of Water Resources, Fish and Game, and Parks and Recreation and approved by the State Park Commission.

8. A zoning plan for the land and water surface of San Luis reservoir and San Luis Forebay be developed cooperatively by the Departments of Water Resources, Parks and Recreation, Fish and Game, and the U. S. Bureau of Reclamation to reduce conflicts in uses.

9. The Department of Water Resources review designs of fish and wildlife facilities and plans for their operation and maintenance so that other project purposes will not be impaired.

10. State owned lands north of Highway 152 be retained in state ownership to provide a continued natural background to the recreation activities at San Luis reservoir.

11. The State be reimbursed by the federal government the extent agreed to by the state and federal governments.

ADDENDUM A

Other Agencies' Comments on Appendix C

C O P Y

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

REGIONAL OFFICE, REGION 2
P.O. BOX 2511
SACRAMENTO, CALIFORNIA 95811

January 5, 1966

Mr. Carl L. Stetson, District Engineer
State of California
Department of Water Resources
Post Office Box 2385
Fresno, California

Dear Mr. Stetson:

This acknowledges the receipt of your letter of November 23, 1965, enclosing a draft copy of your report "Fish and Wildlife Development Plan" Appendix C to Bulletin 117-7 "San Luis Reservoir and Forebay Recreation Development Plan."

We are in general agreement with the appendix and its development program and particularly with the provisions for mitigation of wildlife losses resulting from project construction.

We wish to emphasize that the reservoir volumes listed in the Fishery Development Plan on page 22 are not definite for the dates mentioned. It is entirely possible that, depending upon the water supply, considerably less acre-feet will be present in the reservoir. If this is the case, and if the number of fish planted is dependent upon water volume, the number of fish may have to be adjusted.

During the fall of 1966, San Luis Forebay will be filling and the pumps will be undergoing testing. This may create a potential turbidity problem which may have an adverse effect on the planted fish.

We agree that project areas should be opened to hunting with adequate safeguards to protect both recreationists and reservoir operations personnel. Both the reservoir and the forebay should become welcome additions to the diminishing waterfowl habitat areas in the San Joaquin Valley.

It is our opinion that the last sentence on page 2 of the summary should be deleted due to the indefiniteness of such an agreement.1/

Sincerely yours,

/s/ C. H. Kadie

C. H. Kadie
Acting Regional Director

1/ Editor's note: In view of the opinion expressed by the U. S. Bureau of Reclamation the last sentence on page 2 of the draft report has been deleted from this text.

C O P Y

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

SAN LUIS UNIT CVP CONSTRUCTION OFFICE
821 WEST L STREET
LOS BANOS, CALIFORNIA 93635

January 4, 1966

Mr. Carl L. Stetson
District Engineer
San Joaquin District
Department of Water Resources
1720 Fulton Street
Fresno, California 93721

Dear Mr. Stetson:

I am sorry for the delay in a review of the draft copy of "Fish and Wildlife Development Plan", Appendix C to Bulletin 117-7, "San Luis Reservoir and Forebay Recreation Development Plan", which you requested by your November 23, 1965 letter.

I have no comments other than questioning the recommendation that hunting be permitted on the San Luis Reservoir. In my opinion this would be hazardous and would not be compatible with planned recreation use, and if allowed, would be most difficult to zone and control.

Sincerely yours,

/s/ J. A. Buchholz

J. A. Buchholz
Project Construction Engineer

C O P Y

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

WESTERN REGIONAL OFFICE
450 Golden Gate Avenue, Box 36063
San Francisco, California 94102

December 15, 1965

Carl L. Stetson
District Engineer
Department of Water Resources
1720 Fulton Street
P. O. Box 2385
Fresno, California 93721

Dear Mr. Stetson:

We have reviewed the draft copy of "Fish and Wildlife Development Plan," Appendix C to Bulletin 117-7, "San Luis Reservoir and Forebay Recreation Development Plan". We like your presentation of the fish and wildlife aspects of the recreation development plan for the San Luis Reservoir and Forebay.

Our comments are as follows:

1. We cannot reconcile your predicted minimum angling demand for each decade through 2020 (page 10) with your anticipated angling success at San Luis Reservoir (page 17) and San Luis Forebay (page 19). Even if the 200,000 angler-days per year associated with a possible reduced acceptable level of success at San Luis Reservoir are added to the 53,000 angler-days that can be supported at San Luis Forebay at present accepted levels of success, the estimated total is 253,000 angler-days per year. According to your projections on page 10, this would be reached in the 2000 - 2010 decade regardless of the angling demand or total predicted recreation use.

2. Although we realize the situation you surveyed at the Mendota Pool is commonplace, we do not believe non-angling use should be used to inflate the predicted angling demand as you have shown on page 11 as predicted annual fishery-related recreation demand. We would assume this non-angling use is already reflected in the total recreation use as sightseers, hikers, boaters, etc.

We have appreciated the opportunity to review your report.

Sincerely yours,

/s/ Leo J. Diederich

Leo J. Diederich
Assistant Regional Director

C O P Y

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
RIVER BASIN STUDIES
650 Capitol Mall, Room 4110
Sacramento, California 95814

December 2, 1965

Mr. Carl L. Stetson
District Engineer, San Joaquin District
State of California Resources Agency
Department of Water Resources
1720 Fulton Street, P. O. Box 2385
Fresno, California 93721

Dear Mr. Stetson:

This is in response to your letter of November 23, 1965, transmitting, for our Sacramento area office review and comment, a draft copy of "Fish and Wildlife Development Plan, Appendix C to Bulletin 117-7, San Luis Reservoir and Forebay Recreation Development Plan, December 1965."

We concur in the San Luis Reservoir and Forebay fishery analysis and in the recommendations for the development, enhancement, and harvest of fish resources. We are also in agreement with the recommendations providing for wildlife management lands, development of wildlife habitat, hunting opportunities, and the provision of operation, maintenance, and replacement funds to maintain wildlife carrying capacity on these lands over the project life.

We note, however, that there is no recommendation for mitigation of waterfowl habitat losses on the grasslands resulting from the elimination of the winter flows of San Luis and Cottonwood Creeks by construction of San Luis Dam. The loss of this prime waterfowl habitat is discussed on page 21 of the draft, and we believe a recommendation should be included to provide that the project mitigate this loss. Your summary of enabling legislation pertaining to preservation of fish and wildlife, on page 1 of your draft, indicates adequate justification for inclusion of this item in your project.

The report of the Bureau of Sport Fisheries and Wildlife on the effects that the San Luis unit will have on fish and wildlife, in all probability, will include a program for fish and wildlife mitigation and enhancement substantially the same as the one outlined in your draft report. It will, in addition, include a request for mitigation of waterfowl habitat losses resulting from construction of San Luis Dam. Mitigation could be accomplished by means of flow releases from project canals to grassland areas,

dedicated to waterfowl management, which presently utilize the winter flows of San Luis and Cottonwood Creeks.

Studies informally prepared by the Bureau of Reclamation indicate that the San Luis unit may be able to provide 5,000 acre-feet of water for waterfowl management between February 1 and April 30, four years out of five over the project life. This amount of water would compensate for the loss of the average annual winter flows from San Luis and Cottonwood Creeks.

Thank you for the opportunity to review and comment. With the inclusion of an adequate recommendation for mitigation of waterfowl habitat losses, this office would concur in your draft report.

Sincerely yours,

/s/ David J. Lenhart

Norman R Chupp
Field Supervisor

cc: 1-RB Portland
Calif. Dept. of Fish and Game, Sacramento

C O P Y

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

PACIFIC SOUTHWEST REGIONAL OFFICE
BOX 36062
450 Golden Gate Avenue
San Francisco, California 94102

December 1, 1965

Mr. Carl L. Stetson
District Engineer
San Joaquin District
Department of Water Resources
1720 Fulton Street
P. O. Box 2385
Fresno, California 93721

Dear Mr. Stetson:

Your letter of November 23 requested our review and comment of the draft copy of Bulletin 117-7, the Fish and Wildlife Development Plan to the San Luis Reservoir and the Forebay Recreation Development Plan.

We appreciate your sending us this report. Unfortunately, we will not be able to review the draft in any meaningful manner due to inadequate staffing. Though we may find it necessary to decline comments occasionally, we hope you will continue to send us the reports. They are very helpful.

Sincerely yours,

/s/ Frank E. Sylvester

Frank E. Sylvester
Regional Director

C O P Y

State of California — The Resources Agency of Califor

MEMORANDUM

To : Mr. Carl L. Stetson
District Director
San Joaquin District
1720 Fulton Street
Fresno, California

Date : December 21, 1965

Subject: Review of Appendix
Bulletin 117-7 - Fish and Wil
Development Plan for San Luis
Reservoir and Forebay

From: Department of Parks and Recreation

As requested in your November 23, 1965, appendix C to Bulletin 117-7, the Fish and Wildlife Development Plan for San Luis Reservoir and Forebay has been reviewed in detail by the Department of Parks and Recreation.

Numerous questions concerning management and operation policies, procedures, and responsibilities were raised during the review. Rather than present these numerous and in some cases extensive comments by memorandum, I suggest that our departments, in conjunction with the Department of Fish and Game schedule a meeting to consider Parks' comments on the subject report. I believe that a meeting of this type will serve as the best method to reconcile among all concerned, the problems which have been uncovered as a result of our review of this report.

Please contact Mr. William Haussler of the Division of Beaches and Parks Recreation Contract Services Unit in connection with setting up the meeting.

Thank you very much for the opportunity to review this report and present our comments prior to publication. By coordinating the views of each of the concerned departments before publication, many operating and management problems can be resolved or minimized.

/s/ Fred L. Jones

Fred L. Jones
Director

FLJ:WJH:lc

cc: Mr. DeTurk
Mr. Hanson
Mr. Knight
Mr. Hiller
Mr. Rowe
Mr. Hjersman
Mr. Emrie
Mr. Jack Fraser

C O P Y

State of California — The Resources Agency of California

MEMORANDUM

To : Mr. Carl L. Stetson
District Director
San Joaquin District
Department of Water Resources
1720 Fulton Street
Fresno, California

Date : January 26, 1966

Subject: Review of Appendix C to Bulletin 117-7 - Fish & Wildlife Development Plan for San Luis Reservoir and Forebay

From: Department of Parks and Recreation

I refer to my December 21, 1965 memorandum, subject above, which suggested that a meeting be held between staff members of our departments and the Department of Fish and Game to resolve the problems which arose as a result of Parks and Recreation's review of Appendix C to Bulletin 117-7.

Two meetings have been held which have resulted in complete agreement on the contents and wording of this draft bulletin.

This memorandum conveys my concurrence in the draft bulletin as agreed to by our respective staff people in a meeting held in my conference room on January 20, 1966.

Thank you for the cooperation extended by Richard Meffley of your staff in bringing the negotiations to a successful conclusion.

/s/ Fred

Fred L. Jones
Director

FLJ:WJH:lc

cc: Mr. Shannon
Mr. DeTurk
Mr. Hanson
Mr. Hjersman
Mr. Hiller
Mr. Rowe
Mr. Emrie

C O P Y

State of California — The Resources Agency

MEMORANDUM

To : Honorable William E. Warne, Director
Department of Water Resources
1416 Ninth Street
Sacramento, California

Date: January 3, 1966

Attention: Mr. Carl L. Stetson, District Director
San Joaquin District

From : Department of Fish and Game

Subject: WP: State of California, Department of Water Resources, San Luis Reservoir and Forebay, Fish and Wildlife Development Plan, Appendix C to Bulletin No. 117-7

Unfortunately, this reply to your memorandum of November 23, 1965, requesting our comments by December 10 on the subject report has been delayed.

You are undoubtedly aware that the Department of Parks and Recreation has expressed serious concern over certain aspects of the report which they feel require clarification before they will express their concurrence. We are working with them to resolve these problem areas. This will require some minor changes in the text of the report and a memorandum of understanding regarding the mutual responsibilities of our three Departments in respect to the management of project lands and waters set aside for fish, wildlife, and recreation.

We believe you will agree with us that these questions should be resolved before you transmit the report to the Legislature. We understand a meeting will be set up shortly between the three Departments to accomplish this. We concur with this approach and will be pleased to meet with you and the Department of Parks and Recreation to work out any necessary details required to assist you in transmittal of the report.

/s/ W. T. Shannon

Walter T. Shannon
Director

C O P Y

State of California — The Resources Agency

MEMORANDUM

To : Honorable William E. Warne, Director
Department of Water Resources
1416 Ninth Street
Sacramento, California 95814

Date: February 14, 1966

Attention: Mr. Carl L. Stetson, District Director
San Joaquin District

From : Department of Fish and Game

Subject: WP - State of California, Department of Water Resources, San Luis Reservoir and Forebay, Fish and Wildlife Development Plan, Appendix C to Bulletin No. 117-7

Enclosed for your review and transmittal to the Legislature as Appendix C to your Bulletin No. 117-7, is our report "Fish and Wildlife Development Plan for San Luis Reservoir and Forebay" dated June 1965.

This report presents a fish and wildlife development plan for San Luis Reservoir and Forebay. Measures required for both preservation and enhancement of these important resources are:

1. Appropriation of $24,400 and $3,450 annually from project funds for capital cost and maintenance of wildlife habitat developments required to compensate for wildlife losses attributed to the project.

2. Request for $144,800 from the General Fund to develop a productive fishery in San Luis Reservoir and Forebay to meet the fishery benefits credited to the project.

We have reviewed our report with the Department of Parks and Recreation in respect to the necessity of incorporating our development plan into the overall management and operation plan being developed for the San Luis State Recreation Area. We are confident that agreements will be worked out whereby fish and wildlife will become an important recreation asset at San Luis Reservoir and Forebay.

/s/ W. T Shannon

Director

C O P Y

State of California

MEMORANDUM

To : Carl L. Stetson, District Engineer
San Joaquin District
1720 Fulton Street
Fresno, California

Date : December 10, 1965

Subject: Draft Copy of Appendix to Bulletin 117-7

From: Bureau of Sanitary Engineering

We have reviewed the above copy of Appendix C to Bulletin 117-7. Since we find no public health significance to the appendix we have no comments.

/s/ H. B. Foster, Jr.

H. B. Foster, Jr., Chief
Bureau of Sanitary Engineering

HBF:ESC:MM

C O P Y

State of California

MEMORANDUM

To : Mr. William E Warne, Director
Department of Water Resources
1416 Ninth Street
Sacramento, California

Date : December 10, 1965

File No.: 10-Mer-152
San Luis Reservoir

Subject :
Bulletin No. 117-7,
Appendix C

From: DEPARTMENT OF PUBLIC WORKS
Director's Office

This refers to Mr. Stetson's memorandum of November 23, 1965, forwarding for review and comment copy of "Fish and Wildlife Development Plan", Appendix C to Bulletin No. 117-7, "San Luis Reservoir and Forebay Recreation Development Plan".

The proposed fish and wildlife plan will not conflict with existing or planned State highway routes in this area.

Thank you for the opportunity to review the proposal and forward our comments.

/s/ John Erreca

JOHN ERRECA
Director of Public Works

C O P Y

BOARD OF SUPERVISORS
COUNTY COURTS BUILDING, COURT HOUSE SQUARE
TELEPHONE (CODE AREA 209) 722-7411
MERCED, CALIFORNIA 95340

January 4, 1966

State Department of Water Resources
1720 Fulton
Fresno, California

Attention: Mr. McIntyre

Dear Mr. McIntyre:

Your office called several days ago regarding the Bulletin sent out from your office entitled "Appendix 'C' to Bulletin 117-7," and asking whether our Board of Supervisors would be making any comments.

I checked our Minutes, and found this report had been referred to Supervisor Emory O'Banion. I have contacted him and he asks that I inform you he has not read all of the report but that he is in agreement with the contents of the report he has read. When he is finished if he has any further comments he will communicate with you.

Yours very truly,

E. T. JOHNSON, County Clerk
and Ex-Officio Clerk of the
Board of Supervisors of the
County of Merced, California

By /s/ E. Ornberg
Deputy

eo

C O P Y

MERCED COUNTY PARK AND RECREATION DEPARTMENT
670 W. 22nd Street
MERCED, CALIFORNIA

January 6, 1966

Mr. Carl L. Stetson
District Engineer, San Joaquin District
State of California, Resources Agency
Department of Water Resources
P.O. Box 2385
Fresno, California

Dear Mr. Stetson:

Relative to your letter dated November 23, 1965, with regard to the "Fish and Wildlife Development Plan", appendix C to Bulletin 117-7, "San Luis Reservoir and Forebay Recreation development Plan", we hereby submit the following comments:

After reviewing the subject plan, we find it generally in conformance with the presentations made by Mr. Lawrence Cloyd, Fish and Game Manager, Region 4, to the San Luis Recreation coordinating Committee, to which Merced County was in complete agreement with the development. We in Merced County approve the subject Plan and report as presented.

We realize that there may be a necessity for changes and deviations from the proposed plan after implementation of same, and in this regard, you can expect continued full cooperation from Merced County.

The Merced County Parks and Recreation Department would like to commend your department for putting together a very fine report with Plans, for the complete development of the Fish and Wildlife Project for the San Luis Reservoir.

Sincerely,

/s/ Pat Cosentino

Pat Cosentino, Superintendent
Parks and Recreation

PC/nm

ADDENDUM B

Report of Department of Fish and Game
"Fish and Wildlife Development Plan
for San Luis Reservoir and Forebay".

Addendum B Errata

The Department of Fish and Game's report "Fish and Wildlife - Development Plan for San Luis Reservoir and Forebay" (Addendum B of this report) is included in its entirety as it was published. To preserve the integrity of the report, no changes have been made in the text. To present the information as accurately as possible, however, this errata sheet has been included by the Department of Water Resources.

Errata

Page 1, first paragraph - Eliminate the last sentence of the paragraph since all lands involved are not under state or federal ownership to date.

Page 4, line 12 - Eliminate "preservation". Fish and wildlife preservation is not among the purposes of state water projects.

Page 15 - San Luis Dam and Reservoir

Crest length: 18,500 feet change to 18,400 feet
Reservoir area (maximum): 13,300 acres change to 13,800 acres

San Luis Forebay

Crest length: 13,500 feet change to 13,086 feet
Forebay area: 2,150 acres change to 2,000 acres

Note

Fish and Game studies in this report were based on seasonal changes in surface areas depicted on Plate 1. Operation studies now being conducted by the Department of Water Resources indicate that seasonal changes would not be as severe as those shown for wet and normal years.

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
WATER PROJECTS BRANCH

A FISH AND WILDLIFE DEVELOPMENT PLAN FOR SAN LUIS RESERVOIR AND FOREBAY

July 1965

Edmund G. Brown
Governor
State of California

Hugo Fisher
Administrator
Resources Agency

Walter T. Shannon
Director
Department of Fish and Game

A FISH AND WILDLIFE DEVELOPMENT PLAN FOR SAN LUIS RESERVOIR AND FOREBAY

Prepared by

Bruce E. Eliason, Fishery Biologist III
Jack R. Beer, Game Manager III

Assisted by

David M. Selleck, Game Management Supervisor
Region 4

Under the Supervision of

George W. McCammon, Fishery Biologist IV

and

Jack C. Fraser, Chief, Water Projects Branch

California Department of Fish and Game

July 1965

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PLATE

(Bound at end of report)

No.	
1	San Luis Reservoir and Forebay, Wildlife Development and Management Plan

SUMMARY

This report presents a fish and wildlife development plan for San Luis Reservoir and Forebay. The plan recommends the use of a 900-acre parcel of land within the project boundary, and certain other lands between project boundary and minimum pool elevation. This is for compensation of wildlife losses that will result from inundation of wildlife habitat. All of the lands involved are in state and federal ownership.

The report requests appropriation of $24,400 from project funds for the capital costs of developing wildlife habitat on specified project lands. An annual appropriation from project funds of $3,450 is requested for operation, maintenance, and replacement costs associated with wildlife habitat compensation development.

Plans for the development of the fishery potential of the reservoir and forebay include plants of warmwater game fish and a two-and-one-half-year initial fishery development program. The objective of the fishery development program would be the formulation of a long-range fishery management program. A General Fund appropriation of $144,800 over a three-year period is requested for the development program and initial fish stocking.

In support of the proposed development plan, the report presents information on preproject wildlife populations, the potentials for development of fish and wildlife resources, and estimates of the recreation use that would result from implementation of the plan.

RECOMMENDATIONS

To protect existing wildlife resources and to develop the fishery enhancement potential of San Luis Reservoir and Forebay, it is recommended that:

1. The nine hundred acres shown on Plate 1 between the Honker Bay and Dinosaur Point recreation areas on San Luis Reservoir and State Highway 152 be retained in state ownership and be developed and maintained for wildlife to mitigate for wildlife losses attributed to the project.

2. Use of certain portions of the shoreline area shown on Plate 1 as project lands with wildlife values should be made available to the Department of Fish and Game for compensatory wildlife habitat development. Such development would be under a plan mutually agreeable to the departments of Parks and Recreation and Water Resources, and the U. S. Bureau of Reclamation.

3. A total of $24,400 be provided to the Department of Fish and Game from project funds to finance the capital costs of developing habitat on wildlife mitigation lands.

4. The Department of Fish and Game be provided with $3,450 from project funds for operation, maintenance, and replacement costs on wildlife lands.

5. An appropriation of $90,100 be made to the Department of Fish and Game over a two-year period from the General Fund for the capital costs of establishing game fish populations in San Luis Reservoir and Forebay.

6. An appropriation of $54,700 be made from the General Fund to the Department of Fish and Game over a two-and-one-half-year

period beginning in 1968 for a fishery development program to develop a long-range fishery management plan for San Luis Reservoir and Forebay.

7. Controlled hunting be permitted on San Luis State Recreation Area in accordance with a wildlife management plan mutually acceptable to the departments of Fish and Game and Parks and Recreation, and approved by the State Park Commission.

8. A zoning plan for the land and water surface of San Luis Reservoir and Forebay be developed cooperatively by the departments of Parks and Recreation, Fish and Game, and Water Resources, and the U. S. Bureau of Reclamation, to reduce conflicts in recreational uses.

INTRODUCTION

The San Luis Reservoir and Forebay of the San Luis Project will have tremendous power to attract the public for water-associated recreation. Some indication of how strong this attractive force will be is provided by the use that has occurred at other large reservoirs throughout the State, such as Shasta, Millerton, Folsom, and Pine Flat, which all draw swarms of people throughout the recreation season. Recognizing that the state population is increasing rapidly and that the public demand for outdoor recreation, particularly when associated with water, is increasing at a rate even faster than that of the population, the Legislature has provided authorization and has directed state agencies to include recreation uses and fish and wildlife preservation and enhancement among the purposes of state water projects. The major legislation pertinent to fish and wildlife mitigation and enhancement of state water facilities is presented below.

> "11900. The Legislature finds and declares it to be necessary for the general public health and welfare that preservation of fish and wildlife be provided for in connection with the construction of state water projects.
>
> "The Legislature further finds and declares it to be necessary for the general public health and welfare that facilities for the storage, conservation or regulation of water be constructed in a manner consistent with the full utilization of their potential for the enhancement of fish and wildlife and to meet recreational needs; and further finds and declares that the providing for the enhancement of fish and wildlife and for recreation in connection with water storage, conservation or regulation facilities benefits all of the people of California and that the project construction cost attributable to such enhancement of fish and wildlife and recreation features should be borne by them.

"The Legislature further finds and declares it to be the policy of this State that recreation and the enhancement of fish and wildlife resources are among the purposes of state water projects; that the acquisition of real property for such purposes be planned and initiated concurrently with and as a part of the land acquisition program for other purposes of state water projects; and that facilities for such purposes be ready and available for public use when each state water project having a potential for such uses is completed."

"11910. There shall be incorporated in the planning and construction of each project such features (including, but not limited to, additional storage capacity) as the department, after giving full consideration to any recommendations which may be made by the Department of Fish and Game, the Department of Natural Resources or any division thereof, including, but not limited to, the Division of Small Craft Harbors and the Division of Beaches and Parks, any federal agency and any local governmental agency with jurisdiction over the area involved, determines necessary or desirable for the preservation of fish and wildlife, and necessary or desirable to permit, on a year-round basis, full utilization of the project for the enhancement of fish and wildlife and for recreational purposes to the extent that such features are consistent with other uses of the project, if any. It is the intent of the Legislature that there shall be full and close coordination of all planning for the preservation and enhancement of fish and wildlife and for recreation in connection with state water projects by and between the Department of Water Resources, the Department of Natural Resources, the Department of Fish and Game, and all appropriate federal and local agencies."

"11910.5. Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating and sightseeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, view points, boat launching ramps, and any others necessary to make the project land and water areas available for use by the public."

"11911. The planning for public recreation use and fish and wildlife preservation and enhancement in connection with state water projects shall be a part of the general project formulation activities of the Department of Water Resources, in consultation and cooperation with the departments and agencies specified in Section 11910, through the advance planning stage, including, but not limited to, the development of data on benefits and costs, recreation land

> use planning, and the acquisition of land. In planning and constructing any project, the department shall, to the extent possible, acquire all lands and locate and construct, or cause to be constructed, the project and all works and features incidental to its construction in such a manner as to permit the use thereof for the preservation and enhancement of fish and wildlife and for recreational purposes upon completion of the project."
>
> "11917" states in part, "The Department of Fish and Game shall manage the fish and wildlife resources at state water projects ...."

This report, as an aid to fulfillment of such directives, describes the preproject wildlife populations and the postproject fish and wildlife potentials of the San Luis Reservoir and Forebay area and presents a fish and wildlife development plan. Implementation of this plan will provide for wildlife preservation and associated recreation opportunity as well as the establishment of a productive fishery at San Luis Reservoir and Forebay, in accord with the management and operation of project lands and waters for all other project purposes.

ACKNOWLEDGMENTS

Various personnel of the Region 4 office of the Department of Fish and Game contributed considerable basic data used in formulation of this development plan. Particular thanks are due Gordon Ashcraft, Robert Brueggemann, and Jack Smith for information relating to preproject wildlife populations and to John Parrish and Dan Christenson for assistance in formulating capital costs and operations budgets.

DEMAND FOR FISH AND WILDLIFE RELATED RECREATION

The public demand for water-associated recreation based on fish and wildlife resources on the west side of the San Joaquin Valley has received little specific study. In general, it is believed this demand is very similar to that which presently occurs throughout the Central Valley. It is particularly comparable to the present use at large, low-elevation reservoirs on the east side of the Central Valley.

The major water-associated recreation uses which can occur at large reservoirs such as San Luis Reservoir and Forebay are fishing, water skiing, swimming, boating, camping, picnicking, hunting, sightseeing, and nature study. Each of these activities is an integral component of reservoir recreation, and each tends to generate additional use in one or more of the other activities. It is important that each type of activity be adequately planned for prior to the time a large reservoir enters its operational state so that recreation demands are satisfied as fully as possible.

Planning for most of the recreational use that will occur at San Luis Reservoir and Forebay and the facilities required for these uses has been completed and summarized in Bulletin 117-7. This supplement to that bulletin completes the planning effort by presenting plans for fish and wildlife development, upon which a substantial portion of the predicted recreational activity will be based.

This section of the report presents estimates of the recreation demand for both consumptive uses and nonconsumptive

activity related to the fishery resource and for nonconsumptive activities related to wildlife resources.

The Fishery Related Recreation Demand

The California Public Outdoor Recreation Plan indicates that more than 4 million angler days were expended in the pursuit of warmwater game fish in California in 1958. The report also indicates that the number of warmwater fishermen could be expected to double by 1980. If the average angler fishes as often in 1980 as in 1958, more than 8 million angler days will be expended on warmwater angling in California in 1980. This increased angling demand will be partially satisfied by a warmwater fishery to be developed at San Luis Reservoir and Forebay.

Although no studies have been conducted to determine the specific demand for angling at San Luis Reservoir and Forebay, the following information is indicative of the demand for angling at this project.

1. The California Public Outdoor Recreation Plan - Part II indicates that in 1958 about 10 percent of all outdoor recreation use in California was angling.

2. Cursory surveys conducted at Millerton Lake State Recreation area indicated that, in 1958, about 10 percent of the recreation use was angling. This use occurred despite the fact that angling was considered to be poor. At other low-elevation reservoirs in the State, where angling is better, angling comprises from 20 to 50 percent of total use.

3. The California Department of Parks and Recreation report, San Luis Reservoir and Forebay Recreation Development

Plan, presented a per capita demand curve for recreation at San Luis Reservoir and Forebay based on the per capita recreation use (which included warmwater fishing, etc.) at Millerton in 1958. This per capita demand curve was used to predict total recreation use at San Luis Reservoir and Forebay. Thus total angling use is included in the predicted recreation use appearing in the above report.

Since subsequent sections of this report indicate that the quality of the fishery at San Luis Reservoir and Forebay will equal or exceed that at Millerton Lake, we can assume that angling demand at San Luis Reservoir and Forebay will be at least 10 percent of the total predicted recreation use. The predicted minimum annual angling demand for each decade from 1960 through 2020 is listed below.

Year	1960	1970	1980	1990	2000	2010	2020
Angler Days	31,000	53,700	86,300	139,800	207,200	295,600	405,800

In addition to direct use of the fishery, i.e., angling use, there will be a significant amount of nonangling recreation associated with the fishery. Illustrative of this are data collected during an angler use survey conducted at the Mendota Waterfowl Management area during the period April 14 to June 27, 1962.

This survey was concerned with both angler and nonangler utilization of the Mendota Pool during April, May, and June. It showed the major utilization at the Mendota Pool to be angling. The quality of angling was poor and onshore recreation facilities, such as paved roads, parking lots, potable water, sanitary facilities, and swimming beaches were practically nonexistent. Analysis

of the data collected from angler parties* during this survey showed that there were 3 nonanglers for every 17 anglers.

Assuming that a similar angler-nonangler relationship will occur at San Luis Reservoir and Forebay, and that angling demand will be 10 percent of the total recreation use, we can say that nonangling recreation demand associated with the fishery will be about 1.5 percent of the total predicted recreation use. The fishery-related recreation demand will then be at least 11.5 percent of the total predicted recreation use at San Luis Reservoir and Forebay. The minimum annual fishery-related recreation demand predicted for each decade is listed below.

Year	1960	1970	1980	1990	2000	2010	2020
Visitor Days	35,650	61,750	99,240	160,770	238,280	339,940	466,670

Wildlife Related Recreation Demand

Projections of hunting demand made in Part 1 of the "California Public Outdoor Recreation Plan" indicate that by 1980 hunting license sales will almost double the 1956-58 level. This report also shows that hunting makes up about 3 percent of all outdoor recreation use statewide and about 6 percent of such use in the San Joaquin Valley. Department of Fish and Game projections predict a steady increase in total hunting license sales through 1980.

In addition to hunting use of wildlife on intensively managed wildlife areas in California, nonconsumptive recreation uses of wildlife such as nature study and photography exceed hunting by as much as 250 percent.

*An angler party included all the people in a car when at least one person fished.

Moreover, San Luis Reservoir will provide an opportunity for waterfowl hunting. The demand for this type of hunting exceeds the supply in the San Joaquin Valley, and it is anticipated that there will be a strong desire on the part of waterfowl hunters to utilize the resources that will be attracted by this project.

Under these conditions, preservation of present wildlife and enhancement of habitat to produce and maintain additional wildlife are necessary to provide for these increased demands.

FISH AND WILDLIFE RESOURCE POTENTIALS

The purpose of this section is to present an estimate of the fish and wildlife potentials at San Luis Reservoir and Forebay as a base for the preparation of the fish and wildlife development and management plan.

The Fishery Potential

The fishery potential of San Luis Reservoir and Forebay, based on the reservoir characteristics shown in Table 1 and preliminary data on operational schedules, was first described in a memorandum from the Director of the Department of Fish and Game to the Director of the Department of Water Resources dated September 18, 1962. This memorandum presented the formal comments of the Department of Fish and Game on the authorized San Luis Reservoir and Forebay.

San Luis Reservoir

A new operational schedule has now been developed for San Luis Reservoir which shows somewhat better conditions for fish life. This schedule is presented in Figure 1.

The major changes are:

1. During a wet year (not defined), the normal pool of 13,250 surface acres would be attained on about May 1. This pool would be maintained until June 1, at which time withdrawals would commence. The reservoir would be drawn down at a rapid rate, reaching the minimum pool of 3,750 surface acres (80,000 A.F.) on November 1. Filling of the reservoir would begin immediately thereafter.

2. During a normal year (not defined), the normal pool of 13,250 surface acres would be reached on about May 20. Withdrawals would commence immediately thereafter and would continue to October 1, when the minimum pool of 3,750 surface acres would be attained. This minimum pool would be maintained until about October 15, at which time refilling of the reservoir would commence.

3. During a dry year (not defined), a pool of about 11,750 surface acres would be attained on May 1. This pool would be maintained until June 1, at which time withdrawals would commence. The reservoir would be drawn down at a rapid rate, reaching the minimum pool of 3,750 surface acres on November 1. Filling of the reservoir would begin immediately thereafter.

The above schedule should provide conditions somewhat more suitable for a warmwater fishery than the schedule originally evaluated. During "wet", "dry", and "normal" years, largemouth bass and white crappie should have some reproductive success. How much success will be achieved in a "normal" year is a matter of speculation, since the effect of rising water levels on largemouth bass and crappie eggs and fry is not known. However, it seems reasonable to assume that at least a portion of those eggs spawned between April 1 and May 10 will survive. Those eggs spawned between May 1 and May 20 of "wet" and "dry" years should have at least average hatching success as compared to success in other warmwater reservoirs of California.

TABLE I

SAN LUIS RESERVOIR AND FOREBAY
STATISTICAL DATA OF THE PRINCIPAL FEATURES

San Luis Dam and Reservoir

Type of dam:	Earthfill
Volume of fill in dam:	75,000,000 cubic yards
Height above streambed:	320 feet
Maximum water surface elevation under normal operation:	544 feet above sea level
Crest length:	18,500 feet
Reservoir area (maximum):	13,300 acres
Reservoir area (minimum):	3,750 acres (80,000 A.F.)
Reservoir capacity:	2,100,000 acre-feet

San Luis Forebay

Type of dam:	Earthfill dike
Height of dike:	70 feet
Crest length:	13,500 feet
Maximum water surface elevation under normal operation:	225 feet above sea level
Forebay area:	2,150 acres
Reservoir Capacity	57,500 acre-feet

Striped bass may have a limited amount of spawning success in San Luis Reservoir. Recent studies indicate that limited reproduction has occurred at Millerton Lake; however, little is known of their spawning requirements in lakes. Continued replenishment of striped bass and white catfish is expected to occur whenever water is being pumped from the forebay to the reservoir.

Bluegill and redear sunfish are not expected to have sufficient reproductive success to provide sufficient forage to maintain the expected populations of largemouth bass, white crappie, striped bass, white catfish, and brown bullhead. However, they could provide a minor amount of direct angling benefits.

Threadfin shad, due to their spawning and feeding habits, are expected to become the primary forage fish in San Luis Reservoir. It is probable that sufficient numbers will be pumped into the reservoir to establish a self-maintaining population. Spawning normally occurs in open waters when temperatures exceed 70° F. However, they have been observed spawning in Pine Flat Reservoir as early as April 25 when surface water temperatures were 58° F. Although threadfin shad sometimes feed on bottom organisms, they are primarily plankton feeders. Thus, the extreme drawdown planned for San Luis Reservoir should not seriously affect their spawning success or eliminate their food supply.

The productivity of a lake or reservoir is governed primarily by its surface area, which receives solar radiation required for photosynthesis, and the fertility of its watershed. The surface area of San Luis Reservoir will fluctuate severely. However, in all but "dry years" about 10,000 surface acres will

be exposed to sunlight for an appreciable period. Therefore, this area was used in the calculations of the fishery potential of the reservoir.

Since many white catfish and striped bass are expected to be pumped into San Luis Reservoir from the forebay, and because some successful reproduction of largemouth bass and white crappie is expected to occur in the reservoir, and since threadfin shad populations should provide adequate forage for all these species, the fishery, with moderately intensive management, should yield a minimum of 10 pounds of game fish per surface acre per year. This reservoir could thus support about 13.3 angler days per acre each year under presently accepted levels of success (an average catch of 3/4 pound of fish per angler day). It is quite probable that, if angling opportunities do not increase as rapidly as angling demand, acceptable levels of success may be reduced. The reservoir would then support perhaps 20 angler days per acre per year. With presently accepted levels of angling success, this reservoir could support 133,000 angler days per year under the intensive management program proposed in a subsequent section of this report. If, in the future, acceptable levels of success are reduced to about one-half pound of fish per angler day, this reservoir could support 200,000 angler days per year.

San Luis Forebay

The fishery of the 2,000 surface-acre San Luis Forebay will be supported mainly by fish pumped into the aqueduct from the Delta. White catfish and striped bass are expected to be the primary game fish within the aqueduct, with channel catfish occurring in small numbers. San Luis Forebay would have about the same relative proportions of game fish species as the aqueduct, without any additional fish stocking.

Threadfin shad will be pumped into the aqueduct and forebay in sufficient numbers to establish a self-maintaining population. Since the waters in the forebay are expected to be relatively rich in basic nutrients for fish life, and since threadfin spawning habits are such that successful reproduction should occur, adequate forage for a large population of game fish is expected to be available in this reservoir.

White catfish, striped bass, largemouth bass, and channel catfish will occur in San Luis Forebay, probably in that order of abundance. All four species are considered to be very desirable sport fish by anglers. The white catfish is the primary game fish in the Sacramento-San Joaquin Delta, in terms of numbers of fish caught. Striped bass, due to their large size and sporting qualities, are among the most popular fish in the Central Valley and Bay area. The large size attained by channel catfish makes this species highly prized by sportsmen.

A plant of largemouth bass in the forebay is proposed as part of the fishery development plan for the project. The scheduled 8-foot weekly fluctuation of the forebay will severely restrict

reproduction of this species. However, sufficient reproduction to maintain a fair bass fishery should occur.

San Luis Forebay will be capable of producing a sustained annual yield of at least 20 pounds per surface acre. Since the forebay will be about 2,000 acres in size, the potential annual yield, under the management program proposed in a subsequent section of this report, is estimated to be 40,000 pounds. Assuming an average catch of 3/4 pound per angler day, San Luis Forebay could support at least 53,000 angler days per year.

The Wildlife Potential

Population estimates of the game species of wildlife that are dependent upon habitat which will be inundated by San Luis Reservoir and Forebay are as follows:

Deer	120
Quail	140
Doves	550
Pheasants	22
Rabbits	Not estimated

These estimates for upland game species are based on data gathered by strip-count sampling in representative vegetative types within the project area. The total area of each vegetative type was determined, and the data obtained from strip-count samples were projected on the basis of the total vegetation of each type.

To estimate deer use, the pellet count method was employed on vegetative strips selected at random. It was assumed that deer utilize the area for 150 days each year.

Completion of the project and filling of the reservoir and forebay will remove the habitat features required to sustain these wildlife populations. The reservoir and forebay will add

slightly to the wildlife picture by providing a resting area for waterfowl and possibly some amount of waterfowl and dove food which may be produced in portions of the reservoir area which are alternately flooded and dry during the normal fluctuations of the water level. Losses of dove nesting sites resulting from project construction will be partially offset by tree plantings on recreation sites.

A damaging effect of San Luis Reservoir will be the elimination of natural flows from Cottonwood and San Luis Creeks. Periodic winter and spring flows from these creeks have contributed to the downstream maintenance of marshes in the grassland area of western Merced County. These marshlands form the largest remaining area of prime waterfowl habitat remaining in the San Joaquin Valley. In the past, flood flows have provided valuable nesting areas for waterfowl and water birds. Construction of Los Banos Creek Detention Dam will have an additional damaging effect on waterfowl habitat. There is no possibility of these waterfowl losses being compensated within the project area.

The settlement of San Luis and Los Banos Creek water rights should include provision for mitigation of water losses to waterfowl. Such mitigation should take the form of project water releases to downstream water users for waterfowl management purposes.

Full recreational use of wildlife will be possible only upon completion of these steps:

1. Mitigation of wildlife losses resulting from construction of the project by setting aside a portion of project lands not required for other project purposes and management of those lands for wildlife.

2. Managing of project lands acquired for other purposes to encourage wildlife. This could include habitat development at suitable sites between project take line and minimum pool elevation and on other project lands not required for intensive recreational development under a plan approved by the Park Commission. Project lands extending up Cottonwood Creek and San Luis Creek have particularly high wildlife value.

3. Providing controlled hunting opportunities on project lands where such use is compatible in order to achieve maximum recreation benefits as well as to assure proper management of wildlife populations. Such hunting under the authority of the Park Commission could be regulated in a manner that would not conflict with other recreation uses.

Provision of the recommendations suggested above would assure wildlife an important place in the outdoor enjoyment of people utilizing San Luis Reservoir and Forebay and the associated open lands. Wildlife populations--whether game or nongame--could become a valuable natural asset of the area and could provide a high-quality recreation use. Many wildlife species lose much of their fear of humans when existing in close proximity to intensive human-use areas and thus become excellent subjects for photography, nature study, and esthetic enjoyment because of the ability of people to approach them more closely.

FISH AND WILDLIFE DEVELOPMENT PLAN

The plan presented in this section is designed to provide the means whereby fish and wildlife can contribute to the esthetic enjoyment and recreational experiences of the millions of people who will utilize San Luis Reservoir and Forebay. The preservation and enhancement features proposed here are, to be sure, an integral part of the overall recreation development plan. For example, the establishment of a satisfactory fishery is as essential to full realization of the project benefits attributed to water-associated recreation as is the provision of facilities, such as boat launching ramps, picnic grounds, and camping facilities.

Fishery Development Plan

To fully utilize the fishery enhancement potential of San Luis Reservoir and Forebay, the following developmental measures should be implemented:

1. An initial plant of 400,000 largemouth bass fry or fingerlings in San Luis Reservoir during the summer of 1967, when the reservoir is scheduled to hold 400,000 acre-feet of water.

2. An initial plant of 10,000 white crappie fingerlings in San Luis Reservoir during the summer of 1967.

3. An additional plant of 400,000 largemouth bass fry or fingerlings in San Luis Reservoir during the summer of 1968, when the reservoir is scheduled to contain 1,000,000 acre-feet of water.

4. An initial plant of 50,000 largemouth bass fingerlings and 10,000 channel catfish fingerlings in San Luis Forebay during the fall of 1966.

5. A two-and-one-half-year fishery development program aimed at developing long-range fishery management plans for the reservoir and forebay. The study should begin in 1968 and should terminate with publication of a report in 1971.

The fish planting proposal for San Luis Reservoir has three objectives: (1) to take full advantage of the initial condition of high aquatic productivity that is characteristic of all new reservoirs, (2) to establish a strong population of largemouth bass, and (3) to establish a white crappie population to effectively utilize the large forage fish (threadfin shad) population that will surely develop in the reservoir.

It is believed that implementation of the fish planting proposal will result in an excellent largemouth bass fishery during the first three to five years of project operation.

A two-and-one-half-year fishery development program is needed to formulate an effective plan for maintaining satisfactory angling in both waters. It is anticipated that such a program would produce recommendations for specific management techniques that would yield beneficial results in terms of fish harvest, and for modifications of project operations, where such modifications would be consistent with the primary project purpose of water conservation.

The need for a development program is strong because of the unusual operation schedule planned for the reservoir (figure 1). The extent and rapidity of the annual draw down will result in an unprecedented fluctuation regimen. The knowledge required to effectively manage a sport fishery under such severe environmental

conditions is lacking. The fishery knowledge gained from experience with other fluctuating reservoirs in the State will be only partially applicable to San Luis Reservoir.

Fishery management approaches, specifically designed for San Luis Reservoir and Forebay, will have to be developed by the proposed program. In the absence of such a program, it is doubtful that a suitable fishery could be maintained, particularly in the reservoir proper.

The costs of fish stocking required to develop a satisfactory fishery in the reservoir and forebay are shown in Table 2. The total cost of stocking game fish would be $90,100 over a two-year period. To accomplish this, $50,100 should be appropriated from the General Fund for fiscal year 1966-67 and $40,000 for 1967-68.

The costs of a two-and-one-half-year fishery management study are shown in Table 3.

It would not be necessary to begin the fishery development program until July 1, 1968, at which time the biological characteristics of the reservoir and forebay should be sufficiently developed for productive investigation. The study would terminate on December 31, 1970, with publication of a report presenting recommendations for future fishery management.

The costs of future annual management costs are not shown here, since they would be contingent upon the results of the development program.

TABLE 2

COSTS OF FISH STOCKING IN
SAN LUIS RESERVOIR AND FOREBAY

Species	Size	Number	Cost per fish	Total Cost
San Luis Reservoir				
Largemouth bass	fry or fingerlings	800,000	$0.10	$80,000
White Crappie	fingerlings	10,000	$0.50	$ 5,000
		Subtotal		$85,000
San Luis Forebay				
Largemouth bass	fingerlings	50,000	$0.10	$ 5,000
Channel catfish	fingerlings	10,000	$0.01	$ 100
		Subtotal		$ 5,100
	Total fish stocking costs			$90,100

TABLE 3

COSTS OF FISHERY DEVELOPMENT PROGRAM FOR
SAN LUIS RESERVOIR AND FOREBAY

	1968-69	1969-70	1970-71
Salaries and Wages			
Fishery Biologist II	$ 8,200	$ 8,200	$ 4,100
Seasonal Aid	5,600	5,600	3,720
Retirement, Health, and Welfare	$ 1,225	$ 1,225	$ 695
Operating Expenses			
Travel	$ 1,000	$ 1,000	$ 500
Transportation	600	600	300
Materials and Supplies	500	200	100
Field Office Rental	600	600	300
Report Publication	---	---	150
Equipment			
New	$ 3,000	---	---
Replacement	---	250	125
Administrative Overhead (13%)	$ 2,700	$ 2,300	$ 1,300
Total Annual Costs	$23,425	$19,975	$11,300
Total Study Cost			$54,700

Wildlife Development and Management Plan

Mitigation of wildlife losses would be accomplished on two kinds of project lands, as follows:

1. Mitigation lands. Lands specifically set aside for mitigation of wildlife losses and which will be developed and managed primarily for wildlife purposes.

2. Lands acquired for other purposes. Lands required to serve another project purpose or purposes on which wildlife development and management would be compatible with the primary land uses.

Wildlife Development Plan

Mitigation Lands. The lands proposed for mitigation of wildlife losses that will result from project construction are shown in Plate 1. They include all of the lands lying within the boundary formed by the new freeway (Highway 152), the old Highway 152, the western boundary of the Dinosaur Point and Honker Bay recreation areas, and the 300-foot project take-line between the two recreation areas.

Development of this area for wildlife would include development of permanent drinking water for wildlife, construction of access facilities, construction of brushpiles and two subimpoundments, and manipulation of vegetation to increase the capability of the land to produce and maintain wildlife. This would also include some shrub planting and seeding of food plants.

Wildlife Management Plan

Mitigation Lands. After initial development is completed on these lands, management will be in the form of road and trail

maintenance by Department of Parks and Recreation, periodic inspection by the Department of Fish and Game to assure the adequacy of water at water development sites, and annual evaluations of the habitat and wildlife populations. Signs and interpretive services developed by the two responsible agencies may become an important part of the management on this site.

Lands Acquired for Other Project Purposes. Management of these lands, both shoreline and low-density recreation sites, would be directed toward development and maintenance of vegetative cover to provide habitat for wildlife and provision of public access to the reservoir land and water surface for hunting. Fencing of these areas should be a part of the costs applied to the primary purpose of the lands in question. Project areas which would be of value to wildlife are shown on Plate 1. Project areas opened to controlled hunting would be under a plan concurred in by the departments of Fish and Game, Parks and Recreation, and Water Resources, and the U. S. Bureau of Reclamation, and approved by the Park Commission. Fish and Game regulations regarding seasons, bag limits, and shooting hours would be enforced by the Department of Fish and Game.

It is recommended that public access to the reservoir and wildlife area be provided on the county road which leads to the project boundary at the west end of the proposed Dinosaur Point recreation area, and at other access points as included in an overall management plan. Hunter access is vital to the waterfowl hunting complex involving San Luis Reservoir and the waterfowl hunting clubs and publicly owned waterfowl management areas in the nearby grasslands area of western Merced County. While the

numbers of hunters who will use the reservoir may be small, it is imperative that waterfowl not be allowed to congregate on the reservoir and thus reduce the quality of the grasslands hunting and the total quantity of waterfowl harvested. Failure to maintain this balance could result in serious losses of essential waterfowl habitat caused by changes in land use in the grasslands area, if the waterfowl hunting clubs were forced out due to a reduction in value of their recreation lands.

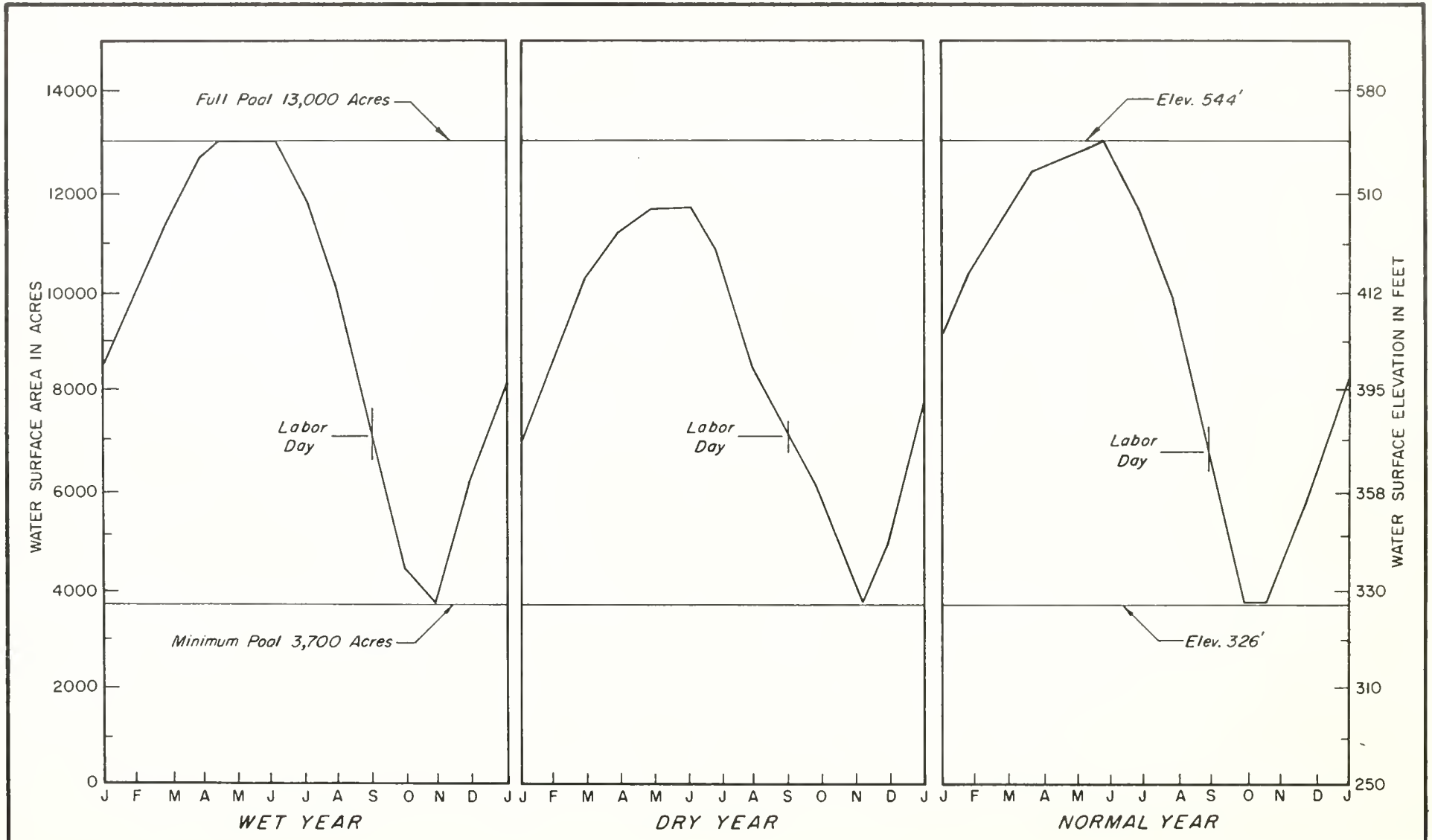
Lands designated on Plate 1 as "Project Lands With Wildlife Values" would be developed for wildlife as partial mitigation for wildlife losses. Such development would include construction of subimpoundments to produce optimum habitat for aquatic forms of animal life and management of native vegetation to benefit resident and migratory wildlife populations.

Wildlife Development and Management Costs

The capital costs of initial development of wildlife habitat on mitigation lands and other project lands are shown in Table 4. The total cost would be $24,400. This sum should be made available to the Department of Fish and Game from project funds in fiscal year 1966-67.

The annual costs of maintaining and managing wildlife lands are shown in Table 5. The sum of $3,450 should be made available to the Department of Fish and Game annually from project funds.

Costs listed in this report do not include those costs required to provide hunting recreation. Such cost items would include manpower needs to regulate hunting, access roads, parking areas, sanitary facilities, checking stations, and associated administrative costs.



SAN LUIS RESERVOIR
SEASONAL CHANGE IN SURFACE AREA

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